

## 640.5 Payment

Cross buck signs measured for payment will be paid for per each. Payment is full compensation for furnishing and erecting the Item complete in place according to the Plans and Specifications, and for providing materials and concrete, excavating, backfilling, and disposing of the surplus materials.

Payment will be made under:

Item No. 640	Retroreflectorized railroad cross buck signs, steel post	Per each
Item No. 640	Retroreflectorized railroad cross buck signs, wood post	Per each

### 640.5.01 Adjustments

General Provisions 101 through 150.

## **Section 641—Guardrail**

### 641.1 General Description

This work includes furnishing and erecting guardrail and appurtenances according to the Specifications. Conform with the lines, grades, and locations shown on the Plans or as directed.

Place W-beam, T-beam, or “T” beam with modified offset block as shown on the Plans and in the Proposal. Unless designated otherwise, references to guardrail shall mean W-beam.

Unless provided for in the Plans, this work also includes:

- Grading to provide the “T” distance shown on the standard behind the guardrail
- Grading to construct shoulder flares for approved guardrail anchorage systems and widened shoulders along guard rail runs according to Section 205 and Section 208
- Furnishing and setting additional posts (all lengths) together with the necessary offset blocks and hardware (when specified in the Plans or in the Proposal)

#### 641.1.01 Definitions

General Provisions 101 through 150.

#### 641.1.02 Related References

##### A. Standard Specifications

Section 205—Roadway Excavation

Section 208—Embankments

Section 645—Repair of Galvanized Coatings

Section 700—Grassing

Section 859—Guard Rail Components

Section 870—Paint

##### B. Referenced Documents

General Provisions 101 through 150.

NCHRP 350

#### 641.1.03 Submittals

General Provisions 101 through 150.

### 641.2 Materials

#### A. Steel Guardrail

Use steel guard rail and steel posts unless specified otherwise on the Plans or in the Proposal.

**B. Guardrail Auxiliary Items**

Ensure that the guardrail includes auxiliary materials and Work to make connections and other guardrail or structures required to complete the construction indicated on the Plans.

**C. Offset Blocks**

Except at locations approved by the Engineer, use plastic offset blocks according to Subsection 859.2.05 “Plastic Offset Blocks” for “W” beam guardrail installation. Offset blocks for “T” beam guardrail installations shall be plastic, or modified steel offset blocks per the Standard Plans including Construction Details and Section 859. When approved by the Engineer, use treated wood offset blocks according to Subsection 859.2.04, “Wood Guard Rail Posts and Offset Blocks.” only in isolated areas of “W” beam or “T” beam guardrail installations, where standard size blocks would not provide a satisfactory fit.

Wood offset blocks and/or wood posts may be specified within the limits of an approved anchorage terminal. Use only one type of offset block within continuous runs of guardrail except in transitions or where specified in the Plan details.

Ensure that materials meet the requirements of these Specifications:

<b>Material</b>	<b>Section</b>
Guardrail Elements and Fittings	859.2.01
Cable End Anchor Assembly	859.2.02
Steel Post and Offset Blocks	859.2.03
Wood Post and Offset Blocks	859.2.04
Plastic Offset Blocks	859.2.05
Galvanized Repair Compound	870.2.05

**641.2.01 Delivery, Storage, and Handling**

General Provisions 101 through 150.

**641.3 Construction Requirements****641.3.01 Personnel**

General Provisions 101 through 150.

**641.3.02 Equipment**

General Provisions 101 through 150.

**641.3.03 Preparation**

General Provisions 101 through 150.

**641.3.04 Fabrication****A. Guard Rail Anchorages, Mounting Devices, and Brackets**

Fabricate and install guardrail anchorages, mounting devices, brackets, and other appurtenances according to the Plan details or as approved by the Engineer.

**641.3.05 Construction****A. Erection of Posts**

1. Wood guardrail posts shall not be used at any location except as required for guardrail anchorage.
2. Set the posts in post holes or drive them vertically at the positions, depth, spacing, and alignment shown on the Plans.
3. Install posts for guard rail on bridges or other structures as detailed on the Plans.
4. Backfill post holes to the ground line with approved material tamped in place in layers of not more than 4 in (100 mm) thick.

5. If posts are driven, protect the tops of the posts with a suitable driving mat or cap. Remove and replace posts damaged during driving, at no additional cost.
6. Backfill the post holes that are drilled in rock as indicated on the Plans or directed by the Engineer.
7. Remove and reset posts that are out of alignment or too low in grade. Do not cut off posts that are too high; drive them to the proper elevation. Do not deviate more than 1/4 in (6 mm) vertical and horizontal post alignment.
8. Fit the posts with an offset block according to this Specification and Plan details.
9. Set additional posts and appurtenances, when required, according to the requirements of this Section and the Plan details.
10. When necessary to place posts in existing pavement, slope paving, etc., exercise extreme care in the cutting process, protect the adjacent areas, and remove all loose material. Cut holes in the existing paved area by drilling or sawing. Replace the pavement material in kind to the full depth of the original pavement, as directed, after the post is installed.

#### **B. Erection of Rail**

Erect the rails to attain a smooth, continuous rail line that conforms to the line and grade of the highway.

Determine the height of the rail from the dimensions shown on the Plans. Use bolts long enough to extend at least 1/4 in (6 mm) beyond the nuts after they are firmly tightened.

Install reflectorized washers on guardrail and anchorages. Where double faced guardrail is located on the inside shoulder of medians, install reflectorized washers only on the side which is nearest to traffic. Install reflectorized washers according to this Specification and Plan details.

#### **C. Damaged Spelter Coating**

Repair damaged spelter coating according to the requirements of Section 645.

#### **D. Guardrail Anchorages**

Guardrail Anchorage Type 12 shall be any guardrail terminal, designed for use with "W" beam guardrail installations, which has been approved by the FHWA as meeting the requirements of the National Cooperative Highway Research Report 350, Test Level 3 (NCHRP-350, TL-3). Where the anchorage is connected to "T" beam guardrail installations, a transition is required as shown in the Standard details.

Construct Type 12 anchorages according to the manufacturer's requirements except for the grading which will be as shown in the Plans and as directed by the Engineer. Obtain copies of the manufacturer's details and installation instructions and provide copies of the same to the Engineer prior to the installation of the unit. Provide a FHWA letter of approval for NCHRP-350, TL-3 compliance of the terminal to be used as Type 12 anchorage.

Yellow and black nose striping, as shown on the Plans will be required on all Type 12 anchorages.

### **641.3.06 Quality Acceptance**

General Provisions 101 through 150.

### **641.3.07 Contractor Warranty and Maintenance**

General Provisions 101 through 150.

## **641.4 Measurement**

#### **A. Guardrail**

Guardrail of the type specified is measured in linear feet (meters), including terminal sections when installed. Measurement does not include guardrail anchorage assembly.

When double faced guardrail of the type specified is installed, the single guardrail on each side of the posts is not measured separately. Each single rail is a component part of the double faced guardrail installation.

#### **B. Guardrail Anchorage Assembly**

This Item is measured by the number of each type installed according to the details shown on the Plans.

#### **C. Guardrail Posts**

All lengths of guardrail posts when shown in the Plans or Proposal as a separate payment Item are measured by the Unit.

**641.4.01 Limits**

General Provisions 101 through 150.

**641.5 Payment**

Guardrail, of the type specified, complete in place including posts, offset blocks, and hardware will be paid for at the Contract Price per linear foot (meter).

Guardrail anchorage assembly will be paid for at the Contract Price per each assembly, complete in place.

All lengths of guardrail posts when shown in the Contract documents as a separate Pay Item will be paid for at the Contract Unit Price. Payment is full compensation for furnishing the posts, offset block, hardware, and Work to complete the Item.

For Projects that do not include grading as a Pay Item, payment for guardrail and guardrail anchorage systems on shoulders includes:

- Embankment material for shoulders as shown on the Standard Details or Plans
- Compacting embankment material for shoulders to the approximate density of the surrounding soils
- Removing existing vegetation and obstructions before placing the embankment
- Grassing the reconstructed area according to Section 700

Payment will not be increased or decreased when wood offset blocks are added to or substituted for steel or plastic offset blocks.

Payment will be made under:

Item No. 641	Guardrail, type_____	Per linear foot (meter)
Item No. 641	Double faced guardrail, type_____	Per linear foot (meter)
Item No. 641	Guardrail for bridges, type_____	Per linear foot (meter)
Item No. 641	Double guardrail for bridges, type_____	Per linear foot (meter)
Item No. 641	Guardrail, Type T, Modified offset block	Per linear foot (meter)
Item No. 641	Guardrail anchorage, type____,	Per each
Item No. 641	Guardrail posts (all lengths)	Per each

**641.5.01 Adjustments**

General Provisions 101 through 150.

## **Section 643—Fence**

**643.1 General Description**

This work includes constructing fence and gates according to these Specifications where shown on the Plans or designated by the Engineer. Ensure that this work conforms with the lines and grades shown on the Plans. The fence types covered by these Specifications are:

- Chain-link
- Woven wire
- Barbed wire
- Field fence
- Barrier fence

**643.1.01 Definitions**

General Provisions 101 through 150.